What to expect from a preoperative manual testicular detorsion during intravaginal torsion of the spermatic cord ?

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What to expect from a preoperative manual testicular detorsion during intravaginal torsion of the spermatic cord ?
Funicular OrchidoTaxy: Testicle torsion reduction using funicular migration.

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Abstract

Purpose: Full preoperative manual detorsion is possible and efficient, for IntraVaginal Torsion (90% of torsions) of the spermatic cord, which is the only reversible ischemia of the testicle. Such a situation occurs spontaneously and recurrently regarding intermittent forms.
Patients and Method: The classic "open book" technique is controversial: contradicted in 30% of cases [1,2] or harmful if applied to pathologies that evoke twisting of the cord.
These two limitations, among others, impose new approaches because, although not yet widespread, this technique has proven its effectiveness.
Funicular OrchidoTaxy based on the physiological mobility of the testicle, promotes detorsion of the cord. It is suitable for the examination of clinical forms of torsions or about differential diagnostics situations (epididymitis...) where there could be a risk of malpractice.
Results: The effectiveness of Funicular OrchidoTaxy, explained by phone to practitioners before they transfer their patients could increase the interest of manual detorsions to lift ischemia during intravaginal testicular torsion.
Conclusion: Intravaginal torsion is a clinical diagnosis for which manual detorsion using Funicular OrchidoTaxy could change the paradigm concerning diagnosis and medical management. While modifying the role of complementary exams, and the patient's circuit, Funicular OrchidoTaxy might improve testicular prognosis for unsuspected torsions.

Keywords: Testicular torsion, abdominal pain, acute scrotum, spermatic cord, manual detorsion, health education and awareness

Résumé

But: Proposer une *alternative à la technique classique* appliquée aux torsions testiculaires lors des Torsions IntraVaginales du Cordon Spermatique (TIVCS) qui représentent 90% des torsions. La TIVCS est la seule ischémie réversible du testicule, la détorsion se produit spontanément et de façon récurrente dans les formes intermittentes. Une détorsion manuelle complète et efficace est donc possible.
Matériel et méthode: Au cours des *TIVCS*, la technique classique de détorsion dite du « livre ouvert » est controversée car 30% des cas la contredisent [1,2], et, appliquée à des pathologies évoquant une torsion du cordon elle serait inappropriée ou délétère.
Ces deux limites seules (parmi d'autres) imposent une nouvelle approche d'autant que cette technique connue mais peu mise en œuvre peut prouver instantanément son efficacité.
L'*OrchidoTaxie Funiculaire* (OTF), basée sur la mobilité physiologique du testicule, favorise la détorsion du cordon. Cette manœuvre convient à l'examen des formes cliniques de torsion autant qu'aux situations de diagnostique différentiel (épididymite, œdème aigu idiopathique…) souvent en cause en cas de plainte lors d'erreurs diagnostiques.
Résultats: L'intérêt de la détorsion manuelle par OTF semble confirmé, pour lever l'ischémie des TIVCS, en raison de l'*efficacité de la manœuvre expliquée par téléphone aux praticiens* qui l'ont réalisé avant le transfert de leur patient.
Conclusion: la torsion du cordon spermatique est un diagnostic clinique. Le paradigme concernant le diagnostic et la prise en charge des suspicions de torsion pourrait-il être modifié par la pratique de l' OTF?
Tout en modifiant le rôle des examens complémentaires et le circuit du patient, l' OTF *intégrée à l'examen systématique de la glande* (outre les bourses aigues) pourrait améliorer le pronostic des torsions non suspectées lors de douleurs abdominales atypiques.

Mots clés: Torsion testiculaire, douleur abdominale, scrotum aigu, cordon spermatique, détorsion manuelle, éducation et santé publique.

Introduction

Intravaginal torsion of testicle [3] annually affects 1 in 4000 males younger than 25 years [4] .The lack of fixation of the testicle at its lower pole by the gubernaculum testis, and a bad reflection of the visceral layer of the tunica vaginalis at the posterior edge of the testicle, characterize, with a vaginal excess the Bell clapper deformity [5,6]. The consecutive hyper mobility of the gland then, relies on the size of the testicle, and on cremasteric muscle activity [7]. Nevertheless, a few conditions are often associated: onset of pain during sleep, especially during the second part of the night, cold weather and physical activities, e.g.: sport, cycling and skating. Trauma account for <10% of cases [8,9]. Though the patient and carers must react promptly, lack of knowledge and shame unfortunately, often lead to a delay, in an appropriate response. The elapsed time between onset of symptoms and examination, known as Presentation Delay (PD) is the first prognosis factor [2]. The PD could also affect the clinical aspect too:
Misdiagnosis or delay to initial examination lead to:

- high orchiectomy rates (24% to 42% because of delayed diagnosis) [3,4]
- atrophy of the testicle for 27% cases after orchiopexies [2]
- anorchia following a missed torsion, at a previous occurrence or for a solitary testicle [5]

These errors often result in a malpractice lawsuit.

Purpose

Once recognised, the prognosis of torsions mostly depends on the Surgical Delay (SD) to reach OR and perform a surgical detorsion [6–10].
The Presentation Delay (PD) added to the Surgical Delay lead to an Ischemia Duration (ID), which should ideally be less than 6 hours. Finally, Dias Filho confirmed [2,11] that the unpredictable squeezing level of the vessels, increases [12] adverse outcomes.
Manual Detorsion (MD) aims to decrease ID so that even a partial detorsion, carried out as soon as possible, at least in the OR, just before installation, coupled with other measures, such as lowering revascularisation syndrome, could increase the final testicular salvage rate [13].

Patients and Method: Case Study 1

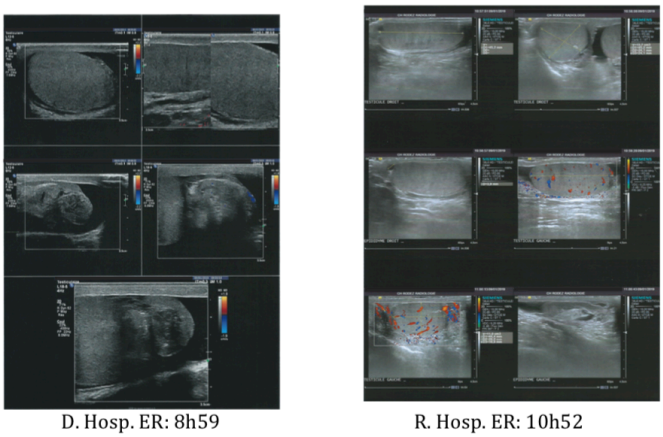
A 17 year old adolescent, woken at 6 a.m. by a left inguinal pain associated with vomiting [14,15], was referred to Rodez Hospital Centre's ER from the overwhelmed ER of a neighbouring secondary hospital. On that first black ice morning of January, emergency services from the whole area were flooded with all kinds of fractures. His mother brought the young boy in quickly, because he had been operated on for right torsion nine months earlier.
On arrival the patient was afebrile. Clinical examination revealed a swollen, tender left testis rated (on a Visual Analog pain Scale) VAS=3.
Doppler UltraSound (DUS) performed at entrance confirmed ischemia of the left testicle (not fixed during the right orchiopexy).
While waiting for the ambulance to transfer the patient to Rodez Regional Hospital, which was about one hour's drive away, we asked the ED physician to apply a new procedure that was being evaluated in a prospective study at Rodez Hospital.
This case provided an opportunity to supervise the procedure named Funicular OrchidoTaxy (FOT) over the telephone to a physician who had never performed any MD before. The new steps consisted of:

1. Performing a genital examination without anaesthesia except MEOPA (if at hand) [16].
2. Applying FOT on the normal gland first so as to train the operator, explain the gesture, reassure the patient and adapt to his morphology (obesity, age, size of the gland, etc.)
3. Keeping in mind the normal aspect of each anatomic area, from groin to epididymis tail, so as to compare with the side treated at the end of MD.

Sudden relief of scrotal pain at the end of the procedure (VAS=0) was noticed just before transfer.
On arrival at Rodez Hospital, 1 hour and 43 minutes later, physical examination with FOT was normal and the DUS confirmed normal vascularization of the left testicle (Fig. 1a,b). Although we had planned the operation for the next day, the patient's mother asked for her son to be transferred from Rodez hospital in order that an elective left orchiopexy could be performed in the patient's local hospital.
We agreed to that demand. It was only recommended that the right testicle be checked as the operative report for the former torsion described an orchiopexy with only two stitches without mentioning non-absorbable sutures. The operation was performed successfully during the patient's school vacation two months later.

Fig. 1 Doppler Ultrasound before and, two hours after detorsion

- a) Left testicle: initial DUS before FOT showing hydrocele and no blood supply
- b) Control DUS (after FOT and transfer) with normal vascularization.



a b

Results: Further examples/case studies.

Two other doctors also referred patients exhibiting similar conditions; both had indeed an onset of pain, related to sexual intercourse:

1. A 22-year-old patient is addressed at midnight, from a nearby hospital emergency practitioner, located two hours from Rodez hospital. Despite all information, the physician refused to take the responsibility of applying the MD. On arrival in the ER, this patient has nevertheless been, treated by FOT 3 hours after the call (ID=7h15mn). Complete detorsion was confirmed, with a normal DUS. The patient underwent bilateral orchidopexy in the morning, 5 hours later and, had a normal DUS 6 months later.
2. Four days later, that same February month, a replacement general practitioner, contacted our Hospital for a same age patient that, she had diagnosed with what she thought was epididymitis. This patient had a recent history of pain, compatible with a spontaneous detorsion. We advised the doctor to apply FOT maneuver, which she did. She immediately noticed the disappearance of pain during examination. Once in the ER, clinical examination, biology and DUS being normal, the patient informed about the need of an orchiopexy, refused to be operated the next day. This gentleman has been lost to Urologic follow-up.

Discussion.

Nash in 1893 has been the first to describe a case of MD. The follow up of two clinical forms of torsions, demonstrated that, intermittent testicular torsion [17] and self-manual reduction [18] even applied over long periods, had better outcomes with efficient MD, than emergency surgery [19]. This is the reason why we strongly support elective orchiopexy [20].

To evaluate FOT, which changes the paradigm, a file framing a new procedure has been developed, in our regional hospital, and new stages have been defined to achieve better results and design a prospective study.

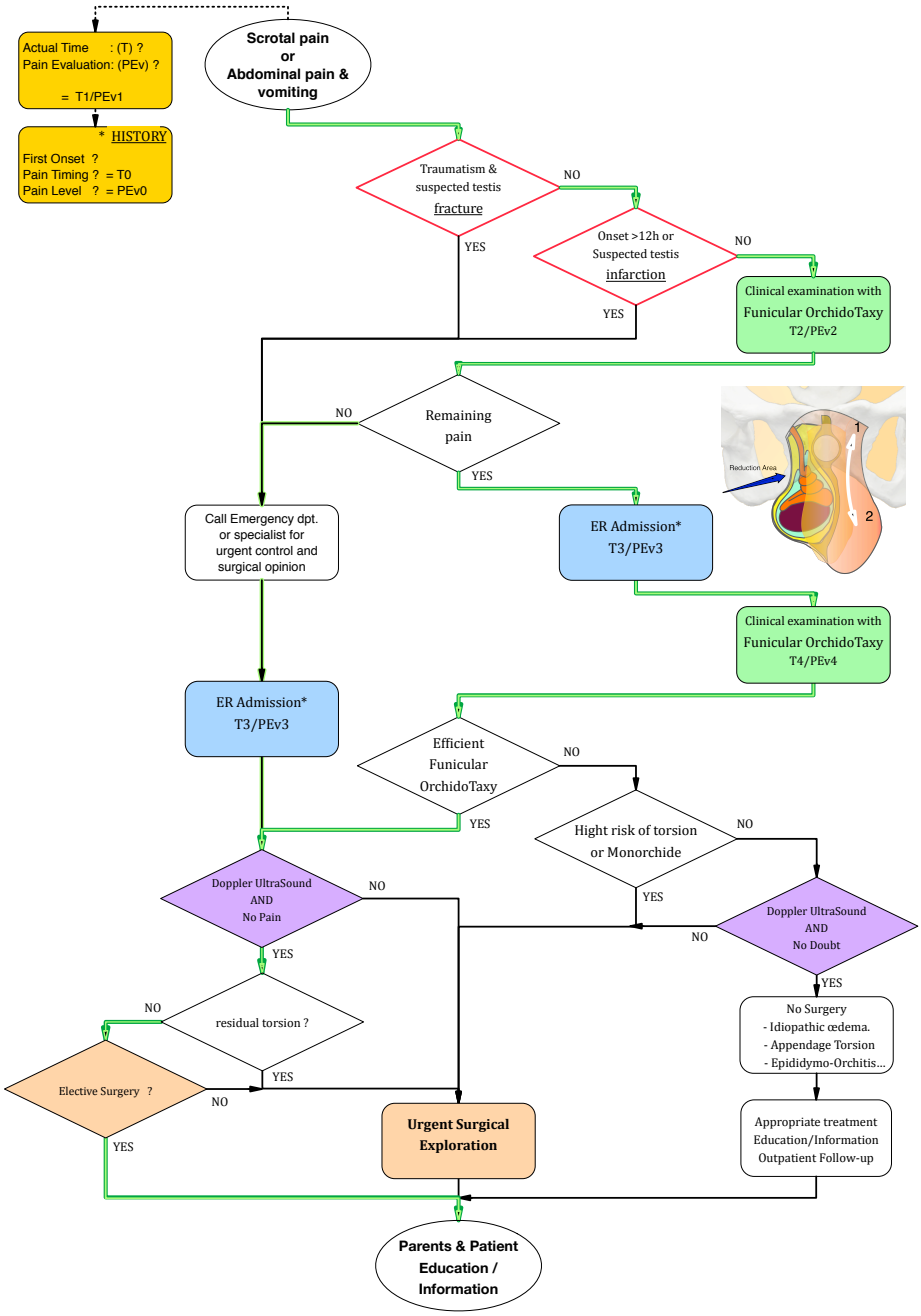
1. To record: Context and time of pain onset, the time of examination and to assess the pain using a Visual Analog Scale.
2. Look for personal or familial history of torsion, hernia, hydrocele, cryptorchidism...
3. To explain the twist and the procedure, to the patient or the child and his parents.
4. Perform the genital examination, under MEOPA, if available.
5. Ask for permission to take pictures, before and after FOT, which certify time and local conditions.
6. Always begin with, the healthy side, confirm its normality then examine, the pathological side using FOT.
7. In case of sudden relief, repeat FOT until detailed examination of all structures could be conducted. Revaluate the pain, compared to the normal side and state the time.

MEOPA is useful in order to perform a MD, but it is not essential. MEOPA allows more comfortable examination conditions, related to its anxiolytic effect. This gas does not disturb the relationship with the patient. MEOPA allows an excellent evaluation of anatomy, not modified by a local injection and, thanks to its euphoriants effects, relaxes the atmosphere. It is moreover possible that the pain related to the torsion is much more responsive to MEOPA than any other scrotal pain (e.g.: contusion or localized infarction, epididymitis, appendage torsion...), without relationships with the cremasteric muscle reaction.

A Manual Detorsion for IVT should meet two expectations (Fig. 2):

- a therapeutic one, being a fast and simple way to drop testicular ischemia.
- a diagnostic one, if usable to distinguish an epididymitis.

Fig. 2 Funicular OrchidoTaxy pathways and contraindications



After a complete successful MD, orchiopexy, as treatment of hypermobility, in order to prevent recurrences, is no longer per se an emergency. FOT aims to allow elective surgery and, gives safer means to wait until orchiopexy.

The young patient in Case Study 1, and his mother, correctly reacted to a moderate inguinal pain, thanks to their experience of dealing with, a former right testicular torsion. [21]
However, when contralateral orchiopexy is not performed, the patient should be informed, about a risk of bilateral Bell-Clapper deformity around 80% [22,23]. The possibility of performing a FOT maneuver when torsion is suspected, could decrease the level of risk associated with, delay in reaching an available operating room, because, all patients are at risk of consecutive testicular atrophy after testicular torsion [2,15,20,24–26] .

Requesting a DUS is not the priority, due to the risk of false negatives. Especially at the beginning of the twist or, just after a spontaneous detorsion, when the gland is sensitive. 46% of cases showing, a venous congestion with, residual perfusion of the gland [27], increase the risk of misdiagnosis with epididymitis [28].
However, DUS could be the best opportunity to, perform and control FOT, as, ultrasound remains essential after a MD or when pain persists after FOT.

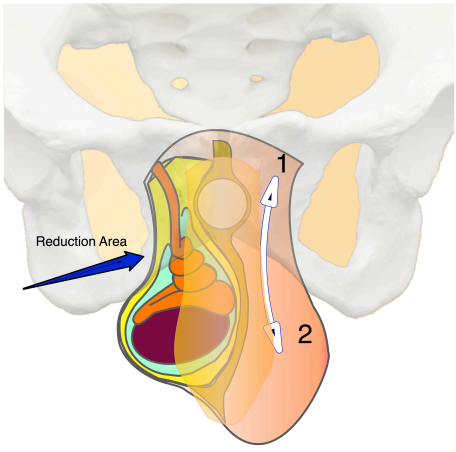
About the maneuver, for a better understanding and a greater self-confidence, we recommended to carry out a self-FOT, or to check the procedure, which is safe, on any normal testicle. This way of proceeding helps, a fast mastering of FOT without previous training, before being able to explain it to the patient and, manually manage a twisted testis.

The principle of performing any MD maneuver, as soon as possible [29] and then monitoring the return to normal, before elective surgery, deserves to be more widespread. This is a simple and reproducible technique, which could be of great benefit, for hospitals in rural areas or, for those with a low pediatric surgical capacity. I would recommend that the procedure be adopted, alongside the development of improved health education.

How to perform a Funicular OrchidoTaxy (FOT)

FOT should be a part of the routine testicular examination. It is a 2 stages maneuver that can be repeated, in the case of spermatic cord torsion, until the complete relief of a normal examination is obtained.
The first stage is a reduction, without grasping any structure: the gland is gently pushed, toward the groin, through the funicular part of the spermatic cord.
The second stage is to massage the cord, as if attempting to push, an oscillating testicle to the scrotum.

Fig. 3 Funicular OrchidoTaxy: Two steps



Intravaginal spermatic cord torsion.
Funicular OrchidoTaxy: Two steps.
* Repeated until complete relief.

Contraindications

The hard necrotic gland, with even, a decreased pain, cannot be recovered.
Extravaginal testicular torsion, which has a different physiopathology, shares that same risk.
Direct trauma or suspicion of testis fracture usually requires DUS as the first examination.
The doubt about ischemia depth and recovering of tissues should be considered, especially for solitary testis. FOT immediately followed by surgery, could buy time in order to decide whether a conservative treatment is necessary.
Clear information about the poor prognosis should be done.

Patient preparation

Consider medical treatment for revascularization syndrome.
Give appropriate explanations, to the patient and his parents, about the torsion and the benefits of MD without general anesthesia. Slow speech and movements decrease anxiety.
Patient must be settled comfortably in supine position and the practitioner placed in the usual position to perform genital examination.
Begin any examination with MEOPA, if available.
Perform a complete examination of the normal side with FOT.
Funicular migration of the testicle is more easily achieved, if the penis is placed in dorsal position (downwards). Begin to move the testicle, from the root of penis, to the external inguinal ring.
Slowly repeat the movement and continue to explain the procedure to the patient, until complete relaxation is achieved.
All spermatic cord elements, to be compared with, must be identified.

FOT maneuver

Two stages are required to evaluate pain, size, consistency and sensitivity of the testicle and epididymitis, compared to the normal side.

1. Move the testicle towards the groin through the funicular area just pushing without force, grabbing, towing or turning the gland.
2. Massage the cord from top to bottom of its funicular portion and push the testicle to the scrotum.
   Repeat the two steps until complete relief.

Detorsion criteria's

Immediate pain relief.
Symmetrical consistency and mobility of the testicle.
Symmetrical cord examination.
New scrotal shape and skin aspect,
Loss of abnormal horizontality of the testicle.
Recovered Cremasteric reflex, if initially absent.
A final picture normalized compared, to an initial picture.

FOT interest

The diagnosis of a teenager with acute scrotum is very difficult because of the pain and the classical technique, as opposed to FOT, requires the practitioner to grasp a slippery testicle to appreciate if the pain increases or not, in order to confirm the right direction and possibly leave a residual torsion.
In the case of atypical presentations, e.g. abdominal pain and vomiting, epididymitis, torsion of testicular appendage, during which testicular examination is systematic, one would not need to turn a "non twisted testicle". Finally the open book technique seems dedicated to sole "recognized" torsions just before performing an emergent surgery.
Because the reactionary hydrocele appears to be useful to reach the funicular area, any puncture should be avoided.
Most crucially, FOT may give the practitioner and the patient an opportunity to unmask a hyper vascularised epididymis, clearing the pain related with a mild torsion. Those "epididymitis" with increased pain, at home, despite antibiotics, will need to return to ER for orchiectomy.

FOT does not untwist the testicle but the mobilization of the gland brings new conditions to the cremasteric muscle, once the testicle reaches the funicular area. This allows spontaneous detorsion of the spermatic cord in the right direction. Pushing the gland while massaging the cord probably helps by allowing spermatic vessels to achieve full detorsion.

Conclusion

While the classic technique to detorse the gland necessitates choosing a direction unsuitable in almost one third of the cases as well as grasping the testicle, Funicular OrchidoTaxy, based on a physiological mobilization of the testis, offers an opportunity to practise painlessly on the healthy testis. The maneuver, when applied to the pathological side, remains standard and allows a spontaneous detorsion of the cord.
This new approach to externally reduce the strangulation of the cord is based on simple anatomical concepts widely shared. In our cases, explanations given to the calling doctors helped them twice to ease the pain and treat their patients immediately before its transfer.
The possible development of this maneuver could modify the patient pathway paradigm, in order to increase testis salvage rate. Areas where people needs time to contact the specialist, dealing with poor conditions (e.g. weather, isolated islands, desert regions) or far from tertiary health care centres, should be concerned.

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